0067443

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

02-RCA-0261

APR 04 2002

Mr. John B. Price
200 Area Section Manager
Nuclear Waste Program
State of Washington
Department of Ecology
1315 W. Fourth Avenue
Kennewick, Washington 99336

Dear Mr. Price:

216-A-29 DITCH HYDRAZINE CONTAINED-IN DETERMINATION (CID) REQUEST

The U.S. Department of Energy, Richland Operations Office (RL), requests that the State of Washington Department of Ecology (Ecology) grant a CID for soils with listed hydrazine waste (U133) at the 216-A-29 Ditch, a treatment, storage and disposal (TSD) unit. This includes the one investigation-derived waste (IDW) drum containing miscellaneous solid waste that was generated during test pit characterization activities at the ditch. Upon approval of this request, RL will remove the U133 listed waste code from the previously generated IDW drum and will not include the code in future 216-A-29 Ditch contaminated soil designations. The listed waste hydrazine, as defined in Washington Administrative Code (WAC) 173-303-081 (3), was released to the 216-A-29 Ditch TSD unit from past operations. The waste site is currently undergoing remedial investigation and closure planning within the 200-CS-1 Operable Unit. A previous CID request for the 216-B-3 Pond and 216-B-3-3 Ditch in June 2000 (00-GWVZ-050) provided the strategy and analytical methods to support this request. The previous request was approved by Ecology on June 22, 2000, in a letter from Jane Hedges, Ecology, to K. Michael Thompson, RL.

The enclosed information is intended to meet the requirements identified in the previous CID. The information includes the results of soil sampling of site materials and summarizes the chemical nature and environmental fate of hydrazine. These results conclude that hydrazine is not present in the soil at levels above the method detection limits and would not be expected to be present based on properties in the soil. The results also conclude that the soil does not contain concentrations of Toxicity Characteristic heavy metals that would require regulation as a dangerous waste pursuant to WAC 173-303-090.

Based on the information, RL requests that Ecology grant a CID request for hydrazine at the 216-A-29 Ditch and for the one IDW drum. This request does not include groundwater associated with this waste site. If you have any questions or need additional information, please contact Cliff Clark, of my staff, (509) 376-9333, or Brian Foley, Waste Management Division, on (509) 376-7087.

Sincerely,

Acting for 4/9/2002

Joel Hebdon, Director
Regulatory Compliance and Analysis Division

RCA:EBD

Enclosure

cc w/ encl:
S. R. Briggs, NHC
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CONTAINED-IN DETERMINATION REQUEST FOR LISTED WASTE HYDRAZINE (U133) AT THE 216-A-29 DITCH

1.0 INTRODUCTION

The following information supports a contained-in determination for soils contaminated with listed waste hydrazine (U133) from past operations at the 216-A-29 Ditch, which is a treatment, storage, and disposal (TSD) unit within the 200-CS-1 Operable Unit (OU). This waste site OU was recently investigated to support definition of corrective actions that may be required pursuant to the *Resource Conservation and Recovery Act of 1976* (RCRA). As part of this investigation, contaminated miscellaneous waste and soils were generated during characterization activities in accordance with the 200-CS-1 OU remedial investigation/feasibility study (RI/FS) work plan and RCRA TSD unit sampling plan (DOE-RL 2000a), the 216-A-29 Ditch sampling and analysis instructions for project W-211 (BHI 2001b), and the waste control plan (BHI 2001a).

Investigation-derived waste (IDW) from the 216-A-29 Ditch currently has to be managed as a listed waste, increasing handling and disposal costs. Because the removal of contaminated soils is a potential remedial option under the 200 Area Implementation Plan (DOE-RL 1999), the listed waste issue also affects the evaluation of alternatives and the cost of remediation. Under the land disposal restrictions, treatment standards for non-wastewater hydrazine waste (including hydrazine waste contained in contaminated soil) require that waste identified as U133 be treated using a specified technology, regardless of concentration of the listed constituent. Specified technologies may include chemical or electrolytic oxidation, chemical reduction, or high-temperature combustion incineration (40 *Code of Federal Regulations* 268.40). Currently, no onsite treatment capacity is available at the Hanford Site for the thermal treatment of contaminated soil and debris.

In accordance with the Washington State Department of Ecology's (Ecology's) contained-in policy (Ecology 1993), contained-in determinations must be based on statistically adequate site-specific data and must, at a minimum, consider the concentration and risk of each constituent for which the hazardous waste was listed and any possible breakdown products. Further, to determine that contaminated soil no longer contains dangerous waste, a demonstration that the soil does not exhibit a characteristic of dangerous waste or contain contaminant concentrations above state-only criteria must be made. The following information and data summary are intended to fulfill these requirements.

1.1 SCOPE OF THE CONTAINED-IN DETERMINATION REQUEST

This contained-in determination request is for removal of the hydrazine (U133) listed waste code from the following contaminated soil:

- One drum of IDW contaminated miscellaneous solid waste associated with test pit excavation activities at locations AD-1, AD-2, and AD-3 in the 216-A-29 Ditch (see Table 1)

- Contaminated soil and miscellaneous solid wastes associated with future remedial investigations and closure activities at the 216-A-29 Ditch TSD unit.

Table 1. Inventory of Waste Drum Generated During 216-A-29 Ditch Field Characterization Activities.

Drum Number	Package Date	Source ID	Depth Interval (ft bgs)	Waste Description
0200E-01-0143	10/31/01	Test Pits AD-1, AD-2, and AD-3	N/A	MSW (Plastic, paper, rubber, cloth, foil)

MSW = miscellaneous solid waste
N/A = not applicable

2.0 BACKGROUND

2.1 WASTE SITE INFORMATION

The 216-A-29 Ditch received discharge from the Plutonium/Uranium Extraction (PUREX) Plant chemical sewer. The ditch was uncovered and unlined and followed the natural topography. The ditch originated outside the perimeter fence and was estimated to be 1,220 m (4,000 ft) in length and 1.8 m (6 ft) wide. The depth of the ditch varied from 0.6 to 4.6 m (2 to 15 ft). The ditch was fed by a 0.9-m (3-ft) corrugated pipe that was connected to a 0.4-m (1.3-ft) vitrified clay pipe. The vitrified clay pipe was then tied to a diversion box that was connected to the chemical sewer. The first 3 m (10 ft) of the head end of the ditch consisted of a concrete spillway designed to control erosion. The ditch had two earthen dams with wooden gate structures to regulate water flow (DOE-RL 1993). The 216-A-29 Ditch emptied into the 216-B-3 Ditches, which terminated at the 216-B-3 Pond (B Pond).

The PUREX Plant chemical sewer operated between November 1955 and July 1991. At the beginning of its operation, the 216-A-29 Ditch received discharge from the PUREX Plant cooling water system and discharge from the chemical sewer. Historical information (GE 1959) indicates an area labeled "A Swamp," which was located where the cooling water discharge may have joined the chemical sewer ditch (i.e., within the Grout Treatment Facility area).

In early 1980, due to effluent monitoring requirements, the chemical sewer lines feeding the 216-A-29 Ditch required upgrades to allow for monitoring and diversion capabilities. A diversion box was upgraded and connected to the 216-A-42 Retention Basin. The basin received chemically or radioactively contaminated diversions from the PUREX Plant chemical sewer line, cooling water line, and steam condensate discharge (Viita 1980).

During 1990, plans were developed and approved to discontinue discharges and to close the 216-A-29 Ditch (WHC 1990). In 1991, all discharges were discontinued and the ditch was isolated (i.e., concrete was placed in the vitrified clay pipes) from the chemical sewer lines. Contaminated soil from the ditch banks was consolidated in the bottom of the ditch, and the side slopes were regraded (using nearby clean soil fill) to minimize erosion and facilitate surveillance. Inside the perimeter fence, the ditch has been filled to grade and surrounded with a light chain barricade, and the area was posted with underground contamination placards. Outside the

perimeter fence, the ditch has been completely covered with backfill and stabilized. As a final measure, the site was revegetated and reposted.

2.2 DANGEROUS WASTE DISCHARGES TO THE 216-A-29 DITCH

The PUREX chemical sewer waste discharges consisted primarily of makeup tank rinses, with lesser quantities of off-specification batches of chemicals, or overflow chemicals from tanks during aqueous makeup. Chemical solutions and dry chemicals commonly consisted of, but were not limited to, nitric, phosphoric and formic acids, sodium and aluminum nitrate, and hydrazine. Discharges regulated under RCRA were designated due to corrosivity (D002), state-only toxicity (WT01 and WT02), cadmium (D006), and hydrazine (U133).

2.3 HISTORICAL HYDRAZINE DISCHARGES

Five known releases of hydrazine from the PUREX Plant between 1984 and 1986 resulted in the release of approximately 640 lb to the 216-A-29 Ditch. In relation to the 240,000,000 m^3 of total effluent discharged into the system, this quantity represents a negligible contribution. Table 2 provides the dates and amounts of these releases. Information on other releases was not identified.

Table 2. Known Hydrazine Releases from the PUREX Plant from Mid-1983 to 1987.[a]

Date of Release	Amount of Release (lb)
June 6, 1984	332
October 2, 1984	280
January 10, 1985	21
May 14, 1985	0.4
July 7, 1986	6
Total	639.4

[a] From DOE-RL, 1990, *216-B-3 Pond System Closure/Postclosure Plan*, DOE/RL-89-28, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Hydrazine Chemical Abstracts Service No. 302-01-2.

3.0 HYDRAZINE CONTAINED-IN STRATEGY

The strategy for obtaining a contained-in determination was previously identified and presented in the *200 Area Hydrazine Contained-in Determination Request* (DOE-RL 2000b). This strategy was based on a letter from the U.S. Department of Energy, Richland Operations Office (RL) to Ecology (Ecology 1993). The sampling strategy for verification of hydrazine concentrations in

soils at the 216-A-29 Ditch was consistent with the strategy presented during the previous request, which called for limited sampling at the test pits within the waste sites.

Pervious literature and Internet searches regarding the nature of hydrazine in the environment were conducted and presented in DOE-RL (2000b). A summary of this information is provided in Section 3.1.

3.1 HYDRAZINE CHARACTERISTICS IN SOIL

Hydrazine rapidly degrades in the environment and is rarely encountered from accidental discharges into water, air, and soil. The World Health Organization indicated that the use of hydrazine in boiler water treatment might result in the brief appearance of hydrazine in waste discharge, but the hydrazine would react with oxygen quickly. Hydrazine will react with dissolved oxygen at a rate inversely proportional to the concentration of the hydrazine. This source also stated that the use of hydrazine as a chemical intermediate would not likely result in its appearance in unreacted form in the environment.

The release of hydrazine to water should result in rapid degradation, especially if high concentrations of organic matter and dissolved oxygen are present. One Internet source, TOXNET (http://toxnet.nlm.nih.gov/), estimated the half-life of hydrazine in pond water to be 8.3 days. Other sources placed the half-life of hydrazine in water from 1 to 20 days. Because discharges of hydrazine in the 200 Areas were aqueous in nature and the last known discharge of hydrazine to the environment was in 1986, hydrazine was not anticipated to be present in the 200 Area soils.

3.2 ANALYTICAL METHODOLOGY

The analytical method used was a spectrophotometric method based on American Society for Testing and Materials (ASTM) Method D 1385 (Attachment B) for testing for hydrazine in water. The method detection limit for this modified soil method was previously determined and presented in the B Pond request for a contained-in determination (DOE-RL 2000b).

4.0 SAMPLING RESULTS

An analysis of the data collected for the 216-A-29 Ditch TSD unit was performed to evaluate if soils are below dangerous waste designation levels. Total volatile and semivolatile organic and metal analyses were performed on soil samples collected during the test pit investigation activities at the 216-A-29 Ditch TSD unit. Holding times were not exceeded for any of the analyses during the sampling event; therefore, the data are considered valid. A conservative 20:1 dilution was used to convert the total analysis values to toxicity characteristic leaching potential (TCLP) values (assuming 100% leaching of the constituent from the soil matrix). All sample results, with the exception of three samples for lead, mercury, and cadmium, showed that soils were below TCLP-regulated concentrations (*Washington Administrative Code* [WAC]

173-303-090). A summary of sample results is contained in Table 3. The three samples that exceeded the 20:1 calculation were re-run using the standard TCLP method[1]. These samples were also analyzed within holding times. The results were below TCLP-regulated concentrations, as indicated in Table 4. Results of the hydrazine sampling are summarized in Table 5.

Table 3. Summary of Characteristic Evaluation for the 216-A-29 Ditch TSD Unit. (2 Pages)

Constituent	Maximum Concentration of Contaminants for the Toxicity Characteristic (mg/L)[a]	Maximum Theoretical Leachate Concentration (mg/L)[b]	Maximum Detected Concentration (mg/kg)	Number of Samples	Number of Detections
Volatile Organic Analytes					
1,2-dichloroethane	0.5	0.00065	0.013	18	1
1,1-dichloroethylene	0.7	0.0004 [c]	ND (0.008)[d]	18	0
2-butanone	200.0	0.0008 [c]	ND (0.016) [d]	18	0
Benzene	0.5	0.0004 [c]	ND (0.008) [d]	18	0
Carbon tetrachloride	0.5	0.0004 [c]	ND (0.008) [d]	18	0
Chlorobenzene	100.0	0.0004 [c]	ND (0.008) [d]	18	0
Chloroform	6.0	0.0004 [c]	ND (0.008) [d]	18	0
Tetrachloroethene	0.7	0.0003	0.006	18	1
Trichloroethene	0.5	0.0004 [c]	ND (0.008) [d]	18	0
Vinyl chloride	0.2	0.0008 [c]	ND (0.016) [d]	18	0
Semivolatile Organic Analytes					
1,4-dichlorobenzene	7.5	0.13 [c]	ND (2.6) [d]	17	0
2,4-dinitrobenzene	0.13	0.13 [c]	ND (2.6) [d]	17	0
2,4,5-trichlorophenol	400.0	0.32 [c]	ND (6.4) [d]	17	0
2,4,6-trichlorophenol	2.0	0.13 [c]	ND (2.6) [d]	17	0
2-methylphenol (cresol, o-)	200.0	0.13 [c]	ND (2.6) [d]	17	0
4-methylphenol (cresol, p-)	200.0	0.13 [c]	ND (2.6) [d]	17	0
Hexachlorobenzene	0.13	0.13 [c]	ND (2.6) [d]	17	0
Hexachlorobutadiene	0.5	0.13 [c]	ND (2.6) [d]	17	0
Nitrobenzene	2.0	0.13 [c]	ND (2.6) [d]	17	0
Pentachlorophenol	100.0	0.32 [c]	ND (6.4) [d]	17	0

[1] TCLP Test Method 1311 in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA Publication SW-846, as incorporated by reference in WAC 173-303-110(3)(a).

Table 3. Summary of Characteristic Evaluation for the 216-A-29 Ditch TSD Unit. (2 Pages)

Constituent	Maximum Concentration of Contaminants for the Toxicity Characteristic (mg/L)[a]	Maximum Theoretical Leachate Concentration (mg/L)[b]	Maximum Detected Concentration (mg/kg)	Number of Samples	Number of Detections
Metals					
Arsenic	5.0	0.61	12.2	18	18
Barium	100.0	5.9	118	18	18
Cadmium	1.0	1.4[c]	28.0[c]	18	12
Chromium	5.0	1.84	36.8	18	18
Hexavalent chromium	5.0	0.44	8.8	18	7
Lead	5.0	19.5[c]	390[c]	18	18
Mercury	0.2	0.26[c]	5.2[c]	18	8
Selenium	1.0	0.05	0.99	18	4
Silver	5.0	2.1	42.0	18	3

[a] WAC 173-303-090.

[b] Determined by dividing the total analytical result by 20 and comparing the resultant concentration to the WAC regulatory limit. This method results in a conservative estimate of the leachable fraction of each constituent using total results in the absence of TCLP results by accounting for the 20 times dilution associated with the TCLP procedure.

[c] Based on maximum detection limit for the nondetected constituent.

[d] Value in parenthesis is maximum detection limit for constituent.

[e] Indicates results greater than regulatory limits (see Table 4).

ND = not detected

Table 4. Summary of TCLP Results for the 216-A-29 Ditch TSD Unit.

Constituent	Sample Number	Maximum Concentration of Contaminants for the Toxicity Characteristic (mg/L)[a]	TCLP Concentration (mg/L)
Cadmium	B13CK9	1.0	0.449
	B13CR3		0.02
	B13CR4		0.0143
Lead	B13CK9	5.0	0.229
	B13CR3		0.159
	B13CR4		0.224
Mercury	B13CK9	0.2	0.0001 U
	B13CR3		0.0001 U
	B13CR4		0.0001 U

[a] WAC 173-303-090.

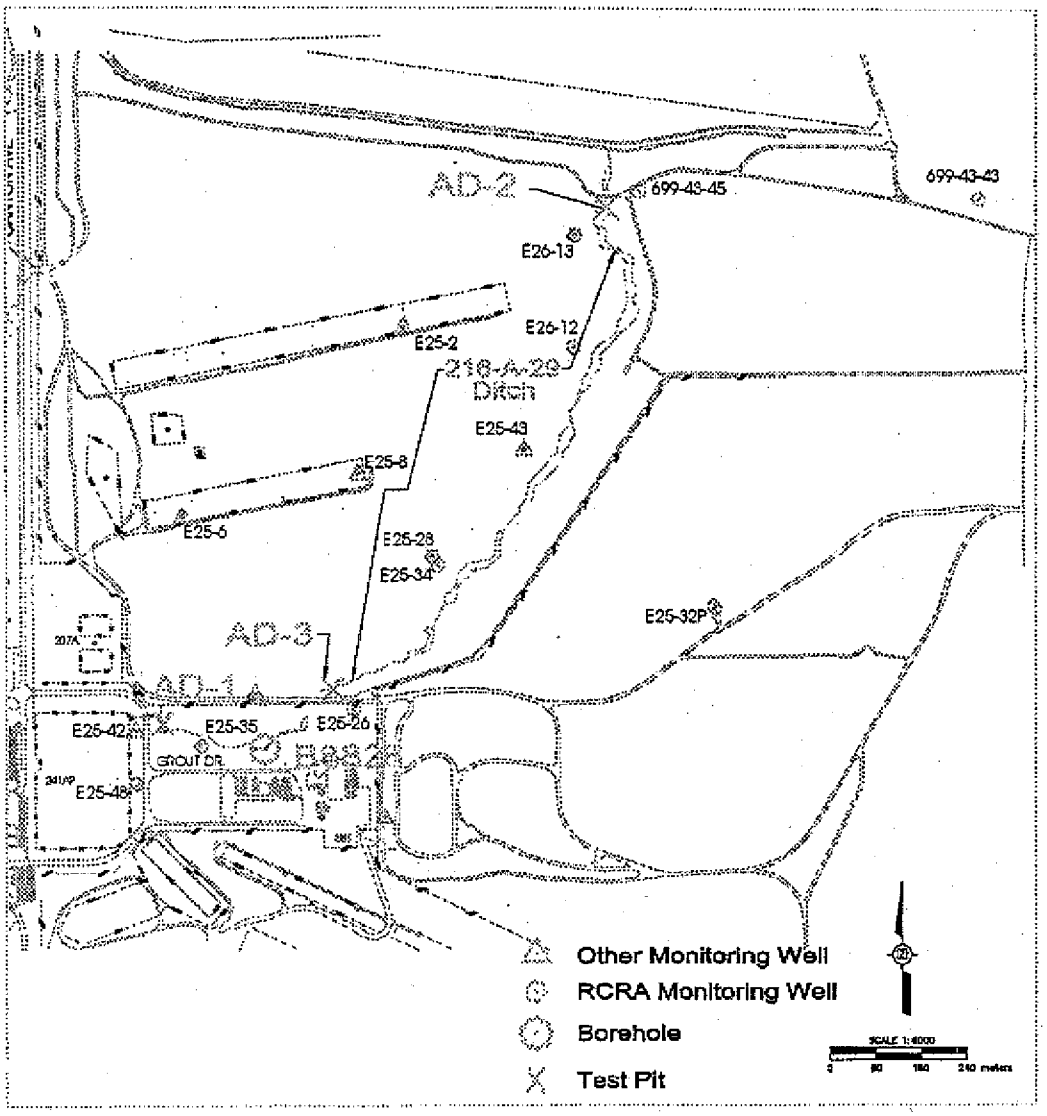
U = Analyzed for but not detected above the minimum detectable activity in the sample.

Table 5. 216-A-29 Ditch TSD Unit Hydrazine Sampling Results.

Sample Location	Sample Interval (ft)	SAF B02-006/008		Hydrazine
		HEIS Number	Sample Date	CAS 302-01-2
				mg/kg
AD-1	4.0-5.0	B13CK9	10/31/01	1.5 U
	6.5-7.5	B13CL0	10/31/01	1.1 U
	9.0-10.0	B13CL1	10/31/01	1.1 U
	11.5-12.5	B13CL2	10/31/01	1.0 U
	14.0-15.0	B13CL3	10/31/01	1.0 U
AD-2	5.0-6.0	B13CR9	11/01/01	1.1 U
	7.5-8.5	B13CR3	11/01/01	1.2 U
	(Duplicate)	B13CR4	11/01/01	1.2 U
	10.0-11.0	B13CR5	11/01/01	1.1 U
	(Split)	B13CR8	11/01/01	--
	13.0-14.0	B13CR6	11/01/01	1.1 U
	15.0-16.0	B13CR7	11/01/01	1.0 U
AD-3	6.0-7.0	B13C81	10/30/01	1.2 U
	8.5-9.5	B13C77	10/30/01	1.1 U
	11.0-12.0	B13C78	10/30/01	1.0 U
	(Duplicate)	B13C89	10/30/01	1.0 U
	13.5-14.5	B13C79	10/30/01	1.0 U
	16.0-17.0	B13C80	10/30/01	1.0 U

-- = not analyzed
CAS = Chemical Abstracts Service number
HEIS = Hanford Environmental Information System
SAF = sampling authorization form
U = Analyzed for but not detected above the minimum detectable activity in the sample.

Figure 1. 216-A-29 Ditch Test Pit Locations.



5.0 REQUEST FOR A CONTAINED-IN DETERMINATION

The *Model Toxics Control Act* (MTCA) Method B unrestricted land use standards for hydrazine are 0.333 mg/kg for direct exposure and a calculated value of 0.000084 mg/kg for groundwater protection in soil. The MTCA Method C industrial standard is 43.8 mg/kg for direct exposure. In accordance with MTCA requirements contained in WAC 173-340-707(2), the practical quantitation limit for a contaminant may be used in lieu of the risk-based action level. The hydrazine data were all below the method detection limit and the practical quantitation limits were not greater than ten times the method detection limit as required by WAC 173-340-707(2)a. Additionally, as identified in Section 3.1, existing information strongly supports that hydrazine would not persist in Hanford Site soil under the conditions in which it was discharged. Contaminated soils were also demonstrated to not exhibit characteristic waste. Taking into consideration these results, RL requests that Ecology grant a contained-in determination for hydrazine (U133) in the 216-A-29 Ditch TSD unit soil and in the IDW drum associated with test pit activities. Upon approval of this request, RL will remove the U133 listed waste code from the previously generated IDW drums and will not include the code in future 216-A-29 Ditch TSD unit contaminated soil designations.

6.0 REFERENCES

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations*, as amended.

BHI, 2001a, *200-CS-1 Chemical Sewer Operable Unit Remedial Investigation/Feasibility Study Waste Control Plan*, WCP-2001-0003, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

BHI, 2001b, *Sampling and Analysis Instruction for the 216-A-29 Ditch for Project W-211*, BHI-01562, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

DOE-RL, 1990, *216-B-3 Pond System Closure/Postclosure Plan*, DOE/RL-89-28, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1993, *PUREX Source Aggregate Area Management Study Report*, DOE/RL-92-04, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1999, *200 Areas Remedial Investigation/Feasibility Study Implementation Plan – Environmental Restoration Program*, DOE/RL-98-28, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 2000a, *200-CS-1 Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, DOE/RL-99-44, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 2000b, *200 Area Hydrazine Contained-in Determination Request,* letter from K. Michael Thompson, U.S. Department of Energy, Richland Operations Office, to E. R. Skinnarland, Washington State Department of Ecology, 00-GWVZ-050, dated June 12, 2000.

GE, 1959, *Unconfined Underground Radioactive Waste and Contamination in the 200 Areas - 1959*, HW-60807, General Electric, Hanford Atomic Products Operation, Richland, Washington.

Ecology, 1993, *Contained-In Policy*, letter from T. Eaton to All Hazardous Waste Staff, Ecology, dated February 19, 1993, Washington State Department of Ecology, Olympia, Washington.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.

TOXNET, National Library of Medicine, Specialized Information Services Division, *TOXNET (Toxicology Data Network)*, February 13, 2002, http://toxnet.nlm.nih.gov, Hazardous Substances Data Bank (HSDB), keyword: hydrazine.

Viita, J. W., 1980, *Title I Report, Chemical Sewer Sampling, Monitoring, Flow Totalizing and Diverting System (PUREX), Project B-190,* Vitro-R-642, Vitro Engineering Corporation, Richland, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

WAC 173-340, "Model Toxics Control Act – Cleanup," *Washington Administrative Code*, as amended.

WHC, 1990, *PUREX Plant Chemical Sewer Stream-Specific Report*, WHC-EP-0342, Addendum 2, Westinghouse Hanford Company, Richland, Washington.

Task Detail Report 04/03/2002 09:06 AM

Parent Task #: **Task #:** DOE-RCA-2002-0261

Subject: Concur: 216-A-29 Ditch Hydrazine Contained-in Determination
Reference #:
Deliverable: None
Category: None
Status: Open
Due Date:
Priority: High
Originator: Mays, Linda G
Originator Phone: (509)376-6657

Assigned By: Self
Assigned Date: 03/27/2002
Assigned Role: Originator
Assigned Due Date:

Routing Lists: *List 2 (active)*

Name	Action	Action Date
Mays, Linda G	Originator	03/27/2002
Hebdon, Joel B	Awaiting Action	

Instructions:

List 1 (inactive)

Name	Action	Action Date
Mays, Linda G	Originator	03/27/2002
Dagan, Ellen B	Approve	03/27/2002
Mattlin, Ellen M	Approve	03/27/2002
Foley, Bryan L	Approve	03/28/2002 7:24
Sanders, George H	Approve	04/02/2002
Williamson, Barbara D	Approve	04/03/2002 8:13

Instructions:

bcc: RCA Off File
RCA Rdg File
AMI Rdg File
EB Dagan, RCA
BL Foley, WMD
RM Hiegel, WMD
GH Sanders, WMD

Attachments:
1. 02-RCA-0261.attach.doc
2. 02-RCA-0261.EBD.doc

Comments

Task Due Date History:

Date Modified	Task Due Date	Modified By
03/27/2002 (original)		Mays, Linda G

-- End of Report --